Customer: Project:	United States Air Force Research Lab Test Stand 2A	oratory		Date:	1-24-01 2
TACNO	DOM 0052	Danwin a Ma	D 0.1F) 1	Ву:	HJW/DJV
TAG NO.	ROV-0053	Drawing No.	o. P&ID 1		
Description: GN2	Pressurant Line to LOX Run Tank Mai	in ROV by-pass			
	* •	◆ ◆ GENERAL	. + + + +		
Manufacturer:	N	Model and Type:	GLOBE		
Balanced Valve:	N	MIL-STD-1246C (Cleanliness Level:	300A	
	* * * :	♦ BODY AND T	<u>RIM</u> ◆ ◆ ◆ ◆		
Nominal Body Siz			Body Rating (PSIC	G)	10,000
Face-to-Face Dime			Inlet Pipe Spec.:		S10K-A
	Reflange F.50XXG04ESA2	· -	Outlet Pipe Spec:		S10K-C
Body Material:	304 SS	_	Trim Material:		By Manufacturer
Seal Leak Class:	V		Bonnet Type:		Regular
	*	◆ ◆ <u>ACTUATO</u>			
Hydraulic/Pneuma	atic (H/P): P	V ACTUATOR	Manufacturer:		
Servo (GPM):	1 1	•	Model:		
Frequency Respon	ice (Hz):	•	Actuation Pressure	(PSIG):	150 (GN2)
Open Stroke Time		•	Close Stroke Time		
Flow Action to (O		-	Sizing Dp (PSI):	(Monc).	10,000
Spring (Y/N):	Y Mode:Close	-	Failure Mode (Elec	etrical):	Close (1)
Positioner:	1 1/1000.01030	•	Internal Filter/Moi		
	ual Handwheel (Y/N): N		Manual Hydraulic		
	Open/Close Limit Switches	-	Manual Trydraune	Wiode Hai	id rump.
	open order milit distribute	•			
	* *	♦ ♦ FLUID DAT	<u>A</u>		
Fluid:	GN2	_	Molecular Weight:		28.008
Min./Max. Temp.	(°F): -50 to 200 °F	<u> </u>	Critical Pressure (F	PSIA):	492.50
COMBRETON'					
CONDITION Flow:	2.40 lbm/sec		Density:		29.62 lbm/ft ³
Inlet Pressure (PS)		-	Outlet Pressure (PS	SIA):	100 (Initialwill increase to
				9500)	
Viscosity:			Vapor Pressure:		
Required Cv Fl at		_	Estimated SL (dBA		
Required Trim:	LINEAR	_	Selected 100% Tra		.5
Keep Cv Within:	- 5% to -10%		Desired Minimum	Cv Turndo	own: NA

- (1) Note: Solenoid valves shall be provided on the valve manifolding to ensure the valve fails in the designated electrical failure mode position.
- (2) Note: Valve shall meet special material and testing requirements for LOX softgoods
- (3) Note: valve must be able to open under full design DP (10,000psi) and valve must fail in designated position under full design DP

Customer:	United States Air Force Resear	rch Laboratory	Date: 01-24-01
Project:	Test Stand 2A		Rev: 1
TAG NO.	ROV-2814	Drawing No. P&ID 2	By: HJW/DJV
Description:	Large LOX Run Line High Po	int Bleed Valve	_
Manufacturer.		♦ ♦ ♦ GENERAL ♦ ♦ ♦ ♦ Model and Type:	GLOBE
Balanced Valve:		MIL-STD-1246C Cleanliness Level:	300A
		♦ ♦ ♦ <u>BODY AND TRIM</u> ♦ ♦ ♦ ♦	
Nominal Body S		Body Rating (PS	
Face-to-Face Dir		Inlet Pipe Spec.	
End Connections		Outlet Pipe Spec Trim Material:	By Manufacturer
Body Material:	Monel 400 VI	Bonnet Type:	Extended
Seal Leak Class:		Boillier Type.	Extended
Hydraulic/Pneur Servo (GPM):	natic (H/P): P	◆ ◆ ◆ ◆ <u>ACTUATOR</u> ◆ ◆ ◆ ◆ Manufacturer: Model:	
Frequency Respo	onse (Hz):	Actuation Press	ure (PSIG): 150 (GN2)
Open Stroke Tin		Close Stroke Tis	me (MSEC): 1000
Flow Action to (Sizing Dp (PSI)	8500
Spring (Y/N):	Y Mode: CLO		
Positioner:			foisture Separator (Y/N): Y
	()	N Manual Hydrau	lic Mode Hand Pump: N
Position Indicate	or: Open/Close Limit Switches		
Fluid:	LOX	♦ ♦ ♦ ♦ <u>FLUID DATA</u> ♦ ♦ ♦ ♦ Molecular Weig	tht: 32.00
Mir./Max. Temp		Critical Pressure	
	3.(1),(323 (3.2))		
CONDITION Flow	Not Critical	Density:	75.10 lbm/ft ³
Inlet Pressure (P	SIA): 6500	Outlet Pressure	
Viscosity		Vapor Pressure:	
Required Cv F1		Estimated SL (d	
Required Trim:	Linear	Selected 100%	
Keep Cv Within	: Not Critical	Desired Minimu	ım Cv Turndown: 30:1

⁽¹⁾ Note: Solenoid valve(s) shall be provided on the valve manifolding to ensure the valve fails in the designated electrical failure mode position

⁽²⁾ Note: Valve shall meet special material and testing requirements for LOX softgoods

Customer.	United States Air Force Research	h Laboratory	Date: 01-24-01
Project:	Test Stand 2A IPD Redesign	·	Rev: 2
,	•		By: HJW/DJV
TAG NO.	ROV-2816	Drawing No. P&ID 1	_
Description.	LOX Run Tank Fill ROV		
		♦ ♦ ♦ ♦ GENERAL ♦ ♦ ♦ ♦	-
Manufacturer:		Model and Type:	GLOBE
Balanced Valve		MIL-STD-1246C Cleanliness Level:	300A
	•	♦ ♦ ♦ <u>BODY AND TRIM</u> ♦ ♦ ♦ ♦	0500
Nominal Body Si		Body Rating (PS)	(G) 8500 M8.5K-C
Face-to-Face Dim		Inlet Pipe Spec.: Outlet Pipe Spec:	
End Connections		Trim Material:	By Manufacturer
Body Material:	Monel 400	Bonnet Type:	Extended
Seal Leak Class:	VI	Bonnet Type.	Latended
		♦ ♦ ♦ ♦ <u>ACTUATOR</u> ♦ ♦ ♦ ♦	
Hydraulic/Pneum	atic (H/P): P	Manufacturer:	
Servo (GPM):		Model:	7000
Frequency Respo		Actuation Pressu	
Open Stroke Tim		Close Stroke Tim	
Flow Action to (C		Sizing Dp (PSI):	100(4)
Spring (Y/N):	Y Mode: CLOSI		
Positioner:			oisture Separator (Y/N): Y
	nual Handwheel (Y/N): N	Manual Hydrauli	c Mode Hand Pump: N
Position Indicato	r: Open/Close Limit Switches		
ra	1.02	♦ ♦ ♦ ♦ <u>FLUID DATA</u> ♦ ♦ ♦ ♦ Molecular Weigh	nt: 32.00
Fluid:	LOX 2204 2000	Critical Pressure	
Min./Max. Temp	. (°F): -320 to 200°	Critical Pressure	(PSIA): 730.30
CONDITION			
Flow:	Not Critical	Density:	74 lbm/ft ³
Inlet Pressure (PS	SIA): 25	Outlet Pressure (PSIA): 20
Viscosity:		Vapor Pressure:	
Required Cv Fl a		Estimated SL (dl	
Required Trim:	Linear	Selected 100% T	
Keep Cv Within:	Not Critical	Desired Minimur	n Cv Turndown: 30.1

- (1) Note: Solenoid valve(s) shall be provided on the valve manifolding to ensure the valve fails in the designated electrical failure mode position
- (2) Note: Valve shall meet special material and testing requirements for LOX softgoods
- (3) Note. This vaive is normally closed and will be subjected to low pressure and flow rates when open. When closed it will be subjected to a maximum differential pressure across the plug of 8500 psig.
- (4) Note: Actuator shall not be capable of opening valve when pressure on outlet (tank) side of valve is >=1000psi

Project: Test Stand 2A IPD Redesign	Customer:	United States Air Force Resea	rch Laboratory		Date: 01-24-01	
Drawing No. P&ID 1						
Description: LOX overboard dump ROV and Emergency Vent					By: HJW/DJV	
Manufacturer:	TAG NO.	ROV-2817	Drawing No.	P&ID 1	•	
Manufacturer: Model and Type: GLOBE Balanced Valve: Model and Type: GLOBE MIL-STD-1246C Cleanliness Level: 300A **** **** *** *** *** *** *** *** ***	Description:	LOX overboard dump ROV at	nd Emergency Vent			
Model and Type: GLOBE Balanced Valve: Model and Type: GLOBE MIL-STD-1246C Cleanliness Level: 300A ****			♦ ♦ ♦ ♦ GENERAL ♦ ♦	++		
Nominal Body Size (IN): 3" Body Rating (PSIG) Face-to-Face Dimension (IN): End Connections: Buttweid (3) Body Material: Monel 400 Trim Material: By Manufacturer Bonnet Type: Extended Hydraulic/Pneumatic (H/P): Servo (GPM): Frequency Response (Hz): Open Stroke Time (MSEC): 1000 Body Rating (PSIG) 8500 M8.5K-C Trim Material: By Manufacturer Extended Monel 400 Trim Material: By Manufacturer Extended Actuation Pressure (PSIG): 1500 (GN2 Close Stroke Time (MSEC): 1000 Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI): 8500	Manufacturer:		Model and Type:		GLOBE	
Nominal Body Size (IN): 3" Body Rating (PSIG) 8500 Face-to-Face Dimension (IN): 16.5" Inlet Pipe Spec: M8.5K-C End Connections: Buttweid (3) Outlet Pipe Spec: M8.5K-C Body Material: Monel 400 Trim Material: By Manufacturer Seal Leak Class: VI Bonnet Type: Extended ★ ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ AC	Balanced Valve:		MIL-STD-1246C Clean	liness Level:	300A	
Nominal Body Size (IN): 3" Body Rating (PSIG) 8500 Face-to-Face Dimension (IN): 16.5" Inlet Pipe Spec: M8.5K-C End Connections: Buttweid (3) Outlet Pipe Spec: M8.5K-C Body Material: Monel 400 Trim Material: By Manufacturer Seal Leak Class: VI Bonnet Type: Extended ★ ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ ★ ★ ACTUATOR ★ AC						
Face-to-Face Dimension (IN): 16.5" Inlet Pipe Spec.: M8.5K-C						
End Connections: Buttweld (3) Outlet Pipe Spec: M8.5K-C Body Material: Monel 400 Trim Material: By Manufacturer Seal Leak Class: VI Bonnet Type: Extended + ** * ACTUATOR * * * * * * * * * * * * * * * * * * *	Nominal Body Si	ze (IN): 3"				
Body Material: Monel 400 Trim Material: By Manufacturer	Face-to-Face Din	iension (IN): 16.5"	Inle	et Pipe Spec.:		
Seal Leak Class: VI Bonnet Type: Extended	End Connections			let Pipe Spec:	M8.5K-C	
Seal Leak Class: VI Bonnet Type: Extended	Body Material:	Monel 40	0 Trin	m Material:	By Manufacturer	
Hydraulic/Pneumatic (H/P): P Manufacturer: Servo (GPM): Model: Frequency Response (Hz): Actuation Pressure (PSIG): 1500 (GN2 Open Stroke Time (MSEC): 1000 Close Stroke Time (MSEC): 1000 Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI). 8500		VI	Bor	nnet Type:	Extended	
Hydraulic/Pneumatic (H/P): P Manufacturer: Servo (GPM): Model: Frequency Response (Hz): Actuation Pressure (PSIG): 1500 (GN2 Open Stroke Time (MSEC): 1000 Close Stroke Time (MSEC): 1000 Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI): 8500						
Node Node			♦ ♦ ♦ ♦ <u>ACTUATOR</u> ♦ ♦	* * *		
Servo (GPM): Model: Frequency Response (Hz): Actuation Pressure (PSIG): 1500 (GN2 Open Stroke Time (MSEC): 1000 Close Stroke Time (MSEC): 1000 Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI): 8500	Hvdraulic/Pneurr	atic (H/P):	Ma	nufacturer:		
Frequency Response (Hz): Actuation Pressure (PSIG): 1500 (GN2 Open Stroke Time (MSEC): 1000 Close Stroke Time (MSEC): 1000 Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI): 8500			Mo	del:		
Open Stroke Time (MSEC): 1000 Close Stroke Time (MSEC): 1000 Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI): 8500		nse (Hz):	Act	uation Pressure	e (PSIG):	1500 (GN2)
Flow Action to (OPEN/CLOSE): CLOSE Sizing Dp (PSI). 8500			Clo	se Stroke Time	e (MSEC):	1000
			Sizi	ing Dp (PSI):		8500
Spring (Y/N): Y Mode: CLOSE (2) Failure Mode (Electrical): CLOSE (1)					ctrical):	CLOSE (1)
Positioner: Internal Filter/Moisture Separator (Y/N): Y						Y
Declutchable Manual Handwheel (Y/N): N Manual Hydraulic Mode Hand Pump: N		nual Handwheel (Y/N):				N
Position Indicator: Open/Close Limit Switches	Position Indicato	r: Open/Close Limit Switches				

$\diamond \diamond \diamond \diamond \underline{FLUID}\underline{DATA} \diamond \diamond \diamond \diamond$			♦ ♦ ♦ ♦ FLUID DATA ♦	* * *		
Fluid LOX Molecular Weight: 32.00	Fluid	LOX				
Min./Max Temp. (°F): -320 to 200° Critical Pressure (PSIA): 736.50	Min./Max Temp	. (°F): -320 to 200°	Crit	tical Pressure (PSIA): 736.50	
CONDITION	CONDITION					
Flow: Not Critical Density: 75.10 lbm/ft ³	Flow:	Not Critica!	Der	nsity:	75.10 lbm/ft ³	
Inlet Pressure (PSIA): 6500 Outlet Pressure (PSIA): 230	Inlet Pressure (PS	6500 GIA):	Out	tlet Pressure (P	SIA): 230	
Viscosity: Vapor Pressure:		,.	Var	oor Pressure:	200	
Required Cv Fi at Lift: Estimated SL (dBA):		Lift:			A):	
Required Trim: Linear Selected 100% Travel Cv: 110		·				
Keep Cy Witnin: Not Critical Desired Minimum Cy Turndown: 30:1						
7.50 Officer 7.50 Officer		7.00 0.11100.			50.1	<u>-</u>

- (1) Note: Solenoid valve(s) shall be provided on the valve manifolding to ensure the valve fails in the designated electrical failure mode position
- (2) Note: Valve shall meet special material and testing requirements for LOX softgoods
- (3) Note Buttweld ends of valve shall match customers pipe wall thickness of .769" and 3.500" pipe OD. Buttweld shall be prepared in accordance with ANSI B31.3 Fig. 328.4.2(a) (use the straight bevel--not the "J" bevel).

failure mode position

***** * CONTROL AND REMOTE OPERATED VALVES * * * ***

Customer:	United States Air	Force Research I	Laboratory	Date: 2-5-01	
Project:	Test Stand 2A			Rev: 0	
				By: HJW/DJV	
TAG NO.	ROV-0022		Drawing No. P&ID 23		
Description:	PN 2002 Activati	on Valve			
Manufacturer:		1	♦ ♦ ♦ GENERAL ♦ ♦ ♦ ♦ Model and Type:	GLOBE	
					
Balanced Valve:		<u>. </u>	MIL-STD-1246C Cleanliness Level	300A	
		.	♦ ♦ BODY AND TRIM ♦ ♦ ♦ ♦		
Nominal Body S	Size (IN):	3"	Body Rating (P	SIG)	3000
Face-to-Face Di		18.12	Inlet Pipe Spec.		S1500-A
	s: Reflange F0308		Outlet Pipe Spe		S1500-A
Body Material:		304SS	Trim Material:		By Manufacturer
Seal Leak Class:		V	Bonnet Type:		Regular
Serve (Cappill)			Model		
Spring (Y/N): Positioner: Declutchable M: Position Indicate	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/ or: Y+Open/Close Lin		Manual Hydrau ★ ★ ★ FLUID DATA ★ ★ ★ ★	me (MSEC); i: Electrical); Moisture Separator (Y/ lic Mode Hand Pump;	N
Frequency Resp Open Stroke Tin Flow Action to (Spring (Y/N): Positioner: Declutchable Management of the Position Indicated Fluid:	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/or: Y+Open/Close Lin	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC); i: Electrical); Moisture Separator (Y/ lic Mode Hand Pump;	1000 3000 OPEN (1) N): Y N
Frequency Resp Open Stroke Tin Flow Action to (Spring (Y/N): Positioner: Declutchable Management of the Position Indicate	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/or: Y+Open/Close Lin	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC); i: Electrical); Moisture Separator (Y/ lic Mode Hand Pump;	1000 3000 OPEN (1) N): Y N
Frequency Resp Open Stroke Tin Flow Action to (Spring (Y/N): Positioner: Declutchable Management Position Indicate Fluid:	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/or: Y+Open/Close Lin	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC); i: Electrical); Moisture Separator (Y/ lic Mode Hand Pump;	1000 3000 OPEN (1) N): Y N
Frequency Resp Open Stroke Tin Flow Action to (Spring (Y/N): Positioner: Declutehable Management of the Position Indicated Fluid: Min./Max. Temp CONDITION Flow:	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/ or: Y+Open/Close Lin GN2 p. (°F): -20 to 1	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC): Electrical): Moisture Separator (Y/ lic Mode Hand Pump: tht: e (PSIA):	1000 3000 OPEN (1) N): Y N
Frequency Resp Open Stroke Tin Flow Action to (Spring (Y/N): Positioner: Declutehable M: Position Indicate Fluid: Min./Max. Temp CONDITION Flow: Inlet Pressure (P	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/ or: Y+Open/Close Lin GN2 p. (°F): -20 to 1	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC): Electrical): Moisture Separator (Y/ lic Mode Hand Pump: tht: e (PSIA): 8.12 (PSIA):	1000 3000 OPEN (1) N): Y N 28.0 492.5
Frequency Resp Open Stroke Tin Flow Action to (Spring (Y/N): Positioner: Declutehable Management of the Management of t	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/ or: Y+Open/Close Lin GN2 p. (°F): -20 to 1	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC): Electrical): Moisture Separator (Y/ lic Mode Hand Pump: tht: e (PSIA): 8.12 (PSIA):	1000 3000 OPEN (1) N): Y N 28.0 492.5
Frequency Resp Open Stroke Tim Flow Action to (Spring (Y/N): Positioner: Declutchable M: Position Indicate Fluid: Min./Max. Temp CONDITION Flow: Inlet Pressure (P	ne (MSEC): (OPEN/CLOSE): Y anual Handwheel (Y/ or: Y+Open/Close Lin GN2 p. (°F): -20 to 1	OPEN Mode: OPEN N): N mit Switches	Actuation Press Close Stroke Ti Sizing Dp (PSI) Failure Mode (I Internal Filter/N Manual Hydrau	me (MSEC): Electrical): Moisture Separator (Y/ lic Mode Hand Pump: tht: e (PSIA): 8.12 (PSIA):	1000 3000 OPEN (1) N): Y N 28.0 492.5

requirements for LOX softgoods

Customer: Project:	United States Air Force Research Test Stand 2A	Laboratory		Date: 01-24-01 Rev: 2
				By: HJW/DJV
TAG NO.	XCV-0010	Drawing N	o. P&ID 1	
Description: GN2	Pressurant Line to LOX Run Tank	Small Pressure Contr	ol Valve	
		♦ ♦ ♦ ♦ GENERAL	_ + + + +	-
Manufacturer:		Model and Type:	-	GLOBE
Balanced Valve:	· · · · · · · · · · · · · · · · · · ·	MIL-STD-1246C	Cleanliness Level:	300A
Nominal Body Siz Face-to-Face Dim		• ◆ ◆ <u>BODY AND T</u>	RIM ◆ ◆ ◆ ◆ Body Rating (PSI Inlet Pipe Spec.: Outlet Pipe Spec.	G) 10,000 S10K-C S10K-C
Body Material:	304SS		Trim. Material:	By Manufacturer
Seal Leak Class:	V		Bonnet Type:	Extended
			Diamet Tyjie.	Lixerided
Hydraulic/Pneuma	atic (H/P): H	♦ ♦ ♦ ACTUATO	R ◆ ◆ ◆ ◆ Manufacturer:	
Servo (GPM):			Model:	
Frequency Respor			Actuation Pressur	
Open Stroke Time			Close Stroke Time	e (MSEC): 300
Flow Action to (O	PEN/CLOSE): OPEN		Sizing Dp (PSI):	10.000
Spring (Y/N):	Y Mode:OPEN		Failure Mode (Eie	ectrical): OPEN (1)
Positioner:			Internal Filter/Mo	isture Separator (Y/N): Y
Declutchable Man	ual Handwheel (Y/N): N		Manual Hydraulic	Mode Hand Pump: N
Position Indicator	: Y+Open/Close Limit Switches			
	•	•		
Fluid:	GN2	·	Molecular Weight	
Min./Max. Temp.	(°F)320 to 200°		Critical Pressure (PSIA): 492.50
CONDITION	100 11 /		.	25.50
Flow:	100 lbm/sec		Density:	27.59 to 29.62 lbm/ft ³
Inlet Pressure (PS	IA): 7500 to 9500		Outlet Pressure (P	SIA): 6500
Viscosity:			Vapor Pressure:	
Required Cv F1 at Required Trim:			Estimated SL (dB.	
	Equal Percentage		Selected 100% Fr	
Keep Cv Within:	+20% to -10%		Desired Minimum	Cv Turndown: 40:1
manifolding to enselectrical failure m		gnated		rill be in close proximity to LOX and er valve during certain filling operations

Customer: Project	United States Air Force Research I Test Stand 2A	Laboratory		Date: 01-24-01 Rev: O By: HJW/DJV	
TAG NO.	XCV-0801	Drawing No	P&ID 47	-	
Description:	GN2 Vent Valve from V-333			_	
		♦ ♦ ♦ GENERAL	* * * *	•	
Manufacturer:		Model and Type:		GLOBE	
Balanced Valve:	45 St	MIL-STD-1246C C	Cleanliness Level:	300A	
		-			
	* *	♦ ♦ BODY AND TE	*		
Nominal Body Siz	te (IN): 2"		Body Rating (PSI	G) 10000	
Face-to-Face Dime	ension (IN): 15:5"		Inlet Pipe Spec.:	S10K-A	-
End Connections:	Reflange F02579G14ES A2		Outlet Pipe Spec:	S10K-A	-
Body Material:	Carbon Steel		Trim Material:	By Manuf	acturer
Seal Leak Class:	V		Bonnet Type:	Regular	
				-	
	•	◆ ◆ ◆ <u>ACTUATOR</u>	<u>₹</u> ♦ ♦ ♦		
Hydraulic/Pneuma	ntic (H/P): P	<u></u>	Manufacturer:		
Servo (GPM):		<u> </u>	Model.		
Frequency Respon			Actuation Pressure		150 (GN2)
Open Stroke Time			Close Stroke Time	e (MSEC):	1000
Flow Action to (O			Sizing Dp (PSI):		10000
Spring (Y/N):	Y Mode: OPEN		Failure Mode (Ele		OPEN (1)
Positioner:				isture Separator (Y/N)	
	ual Handwheel (Y/N): N		Manual Hydraulic	Mode Hand Pump:	У,
Position Indicator:	Y-Open/Close Limit Switches				
	•	♦ ♦ ♦ FLUID DAT			
	th trace amounts of hydrocarbon		Molecular Weight		32.00
Min./Max. Temp.	(°F): -50 to 200°		Critical Pressure (PSIA):	736.50
<u>CONDITION</u>					
Flow:		 .	Density:		3.41 lbm/ft ³
Inlet Pressure (PSI	IA): 5000 to 6000	-	Outlet Pressure (P	SlA): 4	500 to 5100
Viscosity:			Vapor Pressure:		
Required Cv Fl at		<u> </u>	Estimated SL (dB.		
Required Trim:	Linear		Selected 100% Tra		24
Keep Cv Within:	± 10%		Desired Minimum	Cv Turndown:	30:1

- (1) Note: Solenoid valve(s) shall be provided on the valve manifolding to ensure the valve fails in the designated electrical failure mode position
- (2) Note: Valve must be capable of opening against full system DP

Customer: Project:	United States Air Force Resear Test Stand 2A	Date: 01-24-01 Rev: 2
·		By: HJW/DJV
TAG NO.	XCV-2010	Drawing No. P&ID 1
Description: C	3N2 Pressurant line vent	
		♦ ♦ ♦ ♦ GENERAL ♦ ♦ ♦ ♦
Manufacturer:		Model and Type: GLOBE
Balanced Valv	C:	MIL-STD-1246C Cleanliness Level: 300A
	•	♦ ♦ <u>BODY AND TRIM</u> ♦ ♦ ♦ ♦
Nominal Body		Body Rating (PSIG) 8,500
	Dimension (IN): 15.5"	Inlet Pipe Spec.: M8.5K-C
End Connection	4-	Outlet Pipe Spec: M8.5K-C
Body Material		Trim Material: By Manufacturer
Seal Leak Clas	SS: V	Bonnet Type: Extended
		A A A A COMPLETOR A A A A
		♦ ♦ ♦ <u>ACTUATOR</u> ♦ ♦ ♦ ♦
	umatic (II/P): H	Manufacturer:
Servo (GPM):	10	Model.
Frequency Res		Actuation Pressure (PSIG): 3,000
		Close Stroke Time (MSEC): 500
Spring (Y/N):	O (OPEN/CLOSE): OPEN Y Mode: OPEN	Sizing Dp (PSI): 8 500 Failure Mode (Electrical): OPEN (1)
Positioner:	Mode. OF EN	
	Manual Handwheel (Y/N):	
	ator: Y-Open/Close Limit Switches	Manual Hydraulic Mode Hand Pump: N
1 O.M. O. M. Marce	aca. 1 open close mint switches	
		♦ ♦ ♦ ♦ FLUID <u>DATA</u> ♦ ♦ ♦ ♦
Fluid: GOX	K. GN2	Molecular Weight: 28.008
Min./Max. Ter	np. (°F): -320 to 200°	Critical Pressure (PSIA): 492.50
CONTINUE		
CONDITION Flow:	94.2 lbm/sec	Density: 19.57 to 25.62 lbm/ft ³
Inlet Pressure (Outlet Pressure (PSIA): 230
Viscosity:	7000 10 7000	Vapor Pressure:
Required Cv F	Lat Lett:	Estimated SL (dBA):
Required Trim		Selected 100% Travel Cv: 33 vs 15 available
Keep Cv With		Desired Minimum Cv Turndown: 30:1
rech C. A. M.III.	m. = 72070 tO 1070	Desired Minimum CV 1 attidown: 30:1

- manifolding to ensure the valve fails in the designated electrical requirements for LOX softgoods failure mode position

Customer Project	United States Air Force Research I Test Stand 2A	aboratory		Date: 01-24-01 Rev: I	
				By, HJW/DJV	
TAG NO.	ROV-2812	Drawin	g No. P&ID 1	·· -	
Description	LOX Main Run Line Isolation Val-	ve			
Manufacturer.	•	◆ ◆ ◆ GENE Model and Type		GLOBE	
Balanced Valver					
Balanced Valve.	<u></u>	MHL-511)-124	6C Cleanliness Level:	300A	
			D TRIM ♦ ♦ ♦ ♦		
Nominal Body S			Body Rating (PS		
Face to Face Dir		_	Iniet Pipe Spec.:	·	
	S. InletButtweld (4).		Outlet Pipe Spec	:: M8.5K-C	
	Reflange XF12-3.081G67EC4	_	Trim Material:	D 11 C	
Body Material. Seal Leak Class:	Monei 400		Bonnet Type:	By Manufac Extended	aurer
Dear Leak Class.	VI	_	Diffillet Type.	12xtchucc	
	•	◆ ◆ ◆ A CTHA	<u>TOR</u> ♦ ♦ ♦ ♦		
Hydraulic/Pneun	natic (H/P):	V V V ACTOR	Manufacturer:		
Servo (GPM):			Model: ·		
Frequency Respo	onse (Hz):		Actuation Pressu	ire (PSIG): 30	000
Open Stroke Fin			Close Stroke Tin		000
Flow Action to (OPEN/CLOSE): CLOSE		Sizing Dp (PSI)		00
Spring (Y/N):	Y Mode: CLOSE		Failure Mode (E	lectrical r	CLOSE(1)
Positioner.			Internal Filter/M	oisture Separator (Y/N):),
Declatchable Ma	mual Handwheel (Y/N): N		Manual Hydraul	ic Mode Hand Pump:	N
Position Indicate	or: Open/Close Limit Switches				
	◆ 	•	<u> </u>		
Fluic	LOX		Molecular Weigh	nt: 32	.00
Min/Max Temp	o. (°F): −320° to 200°		Critical Pressure	(PSIA): 73	6.50
CONTINUOS					
<u>CONDITION</u> Fiow	2000 lbm/sec		Duranitus	75 10 lbn/ft	
1 1000	2000 10111/800		Density	15 10 15HU	
Inlet Pressure (P	SIA :. 6500	_	Outlet Pressure (PSIA:: 6400	
Viscosity.		-	Vapor Pressure:	<u> </u>	
Required Cx Fl a	a Lift	_	Estimated SL (dl	BA):	
Required Trim	Linear		Selected 100% T		12
Keep Cv Within:	−10% to -10%	<u> </u>	Desired Minimur	m Cv Turndown 30	:1
	iolenoid valve(s) shall be provided on a usure the valve fails in the designated c thon			be designed so it can be rough	4
(3) Note X requirements fo:	alve shall meet special material and te LOX softgoods	sting (customers pip pipe OD. Bu	eld end of valve shall mate pe wall thickness of 3 081 attweld shall be prepared a Fig. 328.4.2(b) (use the co e "I" bevel).	" and 12.75" n accordance with

435 lbm/sec with 9500 psi to 7000 psi inlet pressure. 6800 psi

outlet pressure

Customer: Project.	United States Air Force Research Test Stand 2A	Laboratory		Date: 01-24-01 Rev: 1 By: HJW/DJV	
TAG NO.	XCV-0011	Drawing 1	No. P&ID I	by. III WIDIV	
	Pressurant to LOX Run Tank Larg				
		◆ ◆ ◆ ◆ GENERA			
Manufacturer:		Model and Type:	:	GLOBE	
Balanced Valve:		MIL-STD-12460	Cleanliness Level:	300A	
Nominal Body Siz	• (IN): • 12"/x 8", x 12"	◆ ◆ <u>BODY AND</u>	TRIM ♦ ♦ ♦ ♦ Body Rating (PSI)	G) 10,00 0	
Face-to-Face Dime			Inlet Pipe Spec.:	S10K-C	
End Connections:	Buttweld (3)		Outlet Pipe Spec:	S10K-C	
Body Material:	304SS		Trim Material:	By Manufacture	T
Seal Leak Class:	V		Bonnet Type:	Extended	-
Hydraulic/Pneuma	utic (IL/P):	◆ ◆ ◆ ◆ <u>ACTUAT</u>	OR ♦ ♦ ♦ ♦ Manufacturer:		
Servo (GPM):			Model:		
Frequency Respon			Actuation Pressure		
Open Stroke Time			Close Stroke Time		
Flow Action to (O			Sizing Dp (PSI):	10.000	
Spring (Y/N):	Y Mode:CLOSE		Failure Mode (Ele		
Positioner:	ual Handwheel (Y/N): N			isture Separator (Y/N): Y Mode Hand Pump: N	
	Y+open/close limit switches		Mailtai Hydraune	Wode Hallu Fullip.	-
Fluid: GN2	· 1 · open en.ie anne sintenes	• • • • <u>Fluid da</u>	ATA ◆ ◆ ◆ ◆ Molecular Weight	. 29,000	
Min./Max. Temp.	(°F): -320 to 200°		Critical Pressure (
Williamax, Tellip.	(1 7320 to 200		Citical Fressure (1 SIA). 492.30	
CONDITION					
Flow:	920 lbm/sec (5)		Density:	23.26 to 29.62 lbm/ft ³	
Inlet Pressure (PS)	(A): 5800 to 9500		Outlet Pressure (P	SIA): 4600	
Viscosity:			Vapor Pressure:		
Required Cv Fl at	Lift:		Estimated SL (dB.		
Required Trim:	Equal Percentage		Selected 100% Tr	avel Cv: 722	
Keep Cv Within:	-20% to -10%		Desired Minimum	Cv Turndown: 30:1	
manifolding to enselectrical failure in (3) Note: But pipewall thickness be prepared in accument the compound ang		signated sustomers (4 suttweld shall rea s.4.2(b) (use	may enter valv	vill be in close proximity to LOX and leve during certain filling operations thall meet special material and testing oftgoods	LOX